

What is claimed is:

1. A method for managing type information for operands, the method comprising:  
5        accomplishing the following results through execution of a single instruction:  
         adding an operand tag to a tag stack; and  
         updating a stack pointer for the tag stack to recognize the addition of the  
operand tag to the tag stack.
- 10    2. A method according to claim 1, wherein the single instruction comprises a  
shift instruction.
3. A method according to claim 2, wherein the shift instruction comprises a  
rotate instruction.
- 15    4. A method according to claim 1, further comprising:  
         accomplishing the following results through execution of one instruction:  
         removing an operand tag from the tag stack; and  
         updating the stack pointer for the tag stack to recognize the removal of the  
20    operand tag from the tag stack.
5. A method according to claim 4, wherein the one instruction comprises a  
shift right instruction.
- 25    6. A method for managing type information for operands, the method  
comprising:  
         shifting a bit value of 1 into a register, in conjunction with creation of a  
reference operand; and  
         shifting a bit value of 0 into the register, in conjunction with creation of a  
30    non-reference operand.
7. A method according to claim 6, wherein:

- the register serves as a tag stack register, the tag stack register to be used for storing a stack of operand tags, each operand tag to indicate whether a corresponding operand on an operand stack is to be treated as a reference operand or a non-reference operand; and
- 5        the method further comprises initializing the tag stack register by:  
         assigning a low order bit of the tag stack register to a value of 0; and  
         assigning substantially all other bits of the tag stack register to a value of 1.
8.       A method according to claim 6, further comprising:
- 10       using shift left operations to shift bit values into a low order bit of the register in response to operands being added to an operand stack.
9.       A method according to claim 6, further comprising:
- 15       right shifting bit values in the register in conjunction with removal of the operand.
10.      A method according to claim 9, further comprising:
- shifting the bit value of 1 into a high order bit of the register in conjunction with removal of the operand.
- 20       11.    A method according to claim 6, wherein:
- the register serves as a tag stack register, the tag stack register to be used for storing a stack of operand tags, each operand tag to indicate whether a corresponding operand on an operand stack is to be treated as a reference operand or a non-reference operand; and
- 25       the method further comprises:
- treating a highest order bit with the value of 0 in the tag stack register as a stack pointer; and
- determining a depth of the stack of operand tags, based at least in part on
- 30       a location of the stack pointer.

12. A processing system with control logic for managing type information for operands, the processing system comprising:
- a processor;
  - a machine-accessible medium responsive to the processor; and
  - 5 instructions in the machine-accessible medium, the instructions to implement at least part of a virtual machine when executed by a processing system, the virtual machine to accomplishing the following results through execution of a single instruction:
    - adding an operand tag to a tag stack; and
    - 10 updating a stack pointer for the tag stack to recognize the addition of the operand tag to the tag stack.
13. A processing system according to claim 12, wherein the single instruction to be used by the virtual machine to add the operand tag to the tag stack and to
- 15 update the stack pointer comprises a shift instruction.
14. A processing system according to claim 13, wherein the shift instruction comprises a rotate instruction.
- 20 15. A processing system according to claim 12, the virtual machine further to accomplish the following results through execution of one instruction:
  - removing an operand tag from the tag stack; and
  - updating the stack pointer for the tag stack to recognize the removal of the operand tag from the tag stack.
- 25 16. A processing system according to claim 12 wherein the processor supports a little-endian byte order.
- 30 17. An apparatus containing control logic for managing type information for operands, the apparatus comprising:

- a machine-accessible medium; and
- instructions in the machine-accessible medium, the instructions to implement at least part of a virtual machine when executed by a processing system, the virtual machine to accomplishing the following results through
- 5 execution of a single instruction:
- adding an operand tag to a tag stack; and
  - updating a stack pointer for the tag stack to recognize the addition of the operand tag to the tag stack.
- 10 18. An apparatus according to claim 17, wherein the single instruction to be used by the virtual machine to add the operand tag to the tag stack and to update the stack pointer comprises a shift instruction.
19. An apparatus according to claim 18, wherein the shift instruction comprises
- 15 a rotate instruction.
20. An apparatus according to claim 17, the virtual machine further to accomplish the following results through execution of one instruction:
- removing an operand tag from the tag stack; and
  - 20 updating the stack pointer for the tag stack to recognize the removal of the operand tag from the tag stack.